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〔論　文〕

Confronting Hard Times in the Japanese Automobile Industry : The Restructuring Strategy

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1. Introduction

The Japanese Automobile Industry has experienced four years of continuous decreasing production output for the first time in its post war history. Only now has it begun its first, large scale restructuring process. Out of eleven Japanese automotive companies, four are still showing red figures while seven are delivering only the lowest minimum profits Even Toyota, the most profitable Japanese company, has experienced a decrease in profits from 700 billion Yen to 250 billion Yen, with operating profits for some quarters before last year slipping into the red. this critical situation directly results from a protracted four-year sales slump in the domestic auto market, worsening prospects in export profitability, and the Yen's appreciation. The main reason, however, comes from the consequences of the industry's non-lean features, packed on during the "fat" years of the bubble economy, in which higher fixed costs pushed up the break-even point.

In confronting this critical situation, Japanese automotive companies, on the one hand, are strengthening their global strategy of promoting local production in the United States and in Europe, as well as in developing an international division of labor in the Asian Pacific area. On the other hand, the industry is undergoing major restructuring.

What are the contents of the restructuring strategy ? It affects many areas, such as slowing or even skipping recruiting, reforming the white-collar organization, scaling down middle management, slowing the line production, shutting down plants, as companies have revamped the product development systems by decreasing the number of parts, commonization of parts, using common platforms, decreasing the number of car variations, and reconsidering a possible change cycle of a model depending on car category. In this paper, I would like to describe the contents of the strategic structural change of the Japanese automobile industry through its restructuring strategy and its meaning to the post lean system. In focusing on the Japanese automobile industry, we can see how it has weathered four years of recession and through its restructuring strategy, plans to improve, despite the difficulty.

2. The Difficulty that is Confronting the Japanese Auto Industry

In the span of only three years (1987-1990), the domestic auto market in Japan expanded by a total of 2 million vehicles. This growth included a dramatic proliferation in the number of individual vehicle variations and a shift to the high-end luxury segments of the market. According to statistics in the White Paper on labor, the number of basic model types that were produced in Japan essentially doubled from 200 in 1984 to some 400 in 1991.

This boom left its legacy. This growth led to a sharp expansion in the number of different parts used for an increase in model types. This expansion directly rsponsible for the sharp rise in fixed costs for the industry. Although a highly efficient new model development system and rapid response times to new model changes are seen as characteristic of the Japanese auto industry, the reduction in the model change cycle led to a sharp rise in R & D related expenses during the surging bubble years. However, the response eventually overreached the real needs of most consumers.

Since its peak in 1991, with 7,8 million, Japanese automotive demand has been continuously declining since 1991. The domestic demand fell to 6,9 million in 1992 to 6,4 million in 1993. Many people in the industry were expecting a resumption of demand by 2 million additional vehicles; however this expectation has gone unrealized. Now, no one is forecasting when domestic demand will fully return to its past height. To complicate the problem further, customer tastes are showing increased practicality and sensitivity to price. This gradual change is most telling in the movement from luxury and high-grade vehicles to more practical ones.

If the high demand returns, the industry still must deal with the problem of the Yen "daka" or the drastic appreciation of the Japanese currency. In early 1991, the Yen's exchange rate was about Y138 per U.S.dollar. The rate was changing very quickly. This kind of high appreciation (beyond Y120) affects venicle export profitability on a large scale. For example, a Japanese exporter was losing $ 1,200 to $ 1,000 on average per vehicle. As a result, in 1993 Japanese car prices in u.s. increased 15% to 18% from 1992 with possible further increases in the near future.

After 1 985, with the appreciation of the Yen, Japanese companies could sustain themselves with higher price (i.e. almost a 35% price increase) through their competitiveness on productivity differentials relative to local companies in export markets. After this, they invested more resources in research & development and new engine facilities, which upgraded vehicles by installing electronic devices and high Performance power systems. Following these modifications, car variations increased and changed quickly. These strategies can be interpreted as an initial response to the Yen "daka". It is important to note that these strategies derived from the Japanese market during the bubble economy with an expanding and upgrading car market.

Table 1. Cost Cutting Program by 5 Japanese Auto Companie (1993~1996 Forecast)

Nissan	
Cutting Number of White Coller	4,000
Cutting Number of Worker'	1,000
Parts Commonization	
Decreasing Model Number	40%
Decreasing Number of Parts	40%
Plants Operation Ratio	85%
Total Cutting Expence (1 Billion Yen)	200
Breakdown	
Cost of Parts	100
Labour Cost	25
Parts Commonization	30
Production Efficiency	10
Others	35

Honda	
Cutting Number of White Coller	900
Cutting Number of Worker'	0
Parts Commonization	
Decreasing Model Number	50%
Decreasing Number of Parts	50%
Total Cutting Expence (1 Billion Yen)	60
Breakdown	
Cost of Parts	30
Labour Cost	10
Parts Commonization	10
Production Efficiency	5

Mazda	
Cutting Number of White Coller	5,500
Cutting Number of Worker'	1,000
Parts Commonization	
Decreasing Model Number	40%
Decreasing Number of Parts	40%
Total Cutting Expence (1 Billion Yen)	60
Breakdown	
Cost of Parts	30
Labour Cost	10
Parts Commonization	10
Production Efficiency	5
Others	5

Toyota	
Cutting Number of White Coller	2,000
Cutting Number of Worker'	0
Parts Commonization	
Decreasing Model Number	20%
Decreasing Number of Parts	30%
Total Cutting Expence (1 Billion Yen)	260
Breakdown	
Cost of Parts	200
Labour Cost	20
Parts Commonization	10
Production Efficiency	10
Others	10

Mitsubishi	
Parts Commonization	
Decreasing Model Number	30%
Decreasing Number of Parts	20%
Total Cutting Expence (1 Billion Yen)	40
Breakdown	
Cost of Parts	20
Labour Cost	0
Parts Commonization	10
Production Efficiency	5
Others	5

(Morgan Stanley Tokyo Office Report 1993)

Now their strategies will be to pursue both routes -- productive and upgrading. Mcanwhile, automakers are trying to maintain their minimum car export with competitiveness on relative productivity. Later, they will shift from exporting to local production in general. The intent of these ploys, however, is to bring down the break-even point, which increased considerably during restructuring. (Table 1. Shows Japanese Auto Maker' Cost Cutting Program)

3. Restructuring strategy by Japanese Automakers

Noteworthy is the role that Simultaneous Engineering (SE) has played in terms of productvity and shortening of lead lime for the product development in the Japanese automobile industry. SE has mightily contributed to Japanese companies' excellent performance. So important is SE that companies are implementing it overseas because of the fact that the SE is highly effective in improving efficiency is such developmental systems.

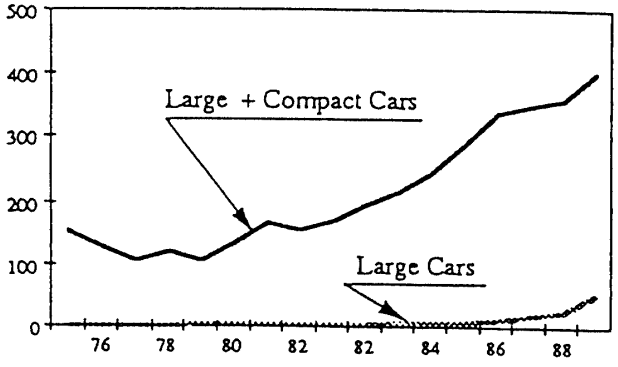
With further refinements in the future, SE is likely to be utilized by auto manufacturers all over the world. We must confirm here, however, that the high efficiency of the Japanese automobile manufacturers' development system does not necessarily assure the effectiveness of the automobile development strategy. This conclusion was clearly validated through experiencing the collapse of the so-called bubble economy which prompted Japanese managers to reconsider their product development strategies.

As has already been discussed, the internationally-praised Japanese product development system has resulted in successive introduction of eye-catching vehicles by virtue of its short lead time and high efficiency. During the excesses of the "bubble economy," such important points as cost reduction and emphasis on fundamental functions of automobiles, as the starting points of automobile development, were all ignored. The strategy of "rapidly in small number," which was the basic pattern of the Japanese manufacturers development strategy, has been changed to that of "rapidly in unreasonably large number." Namely,. owing to the prosperity brought about by the "bubble economy" after 1987, the domestic automobile market in Japan has expanded from 5,700,000 vehicles (including light cars) to 7,800,000 vehicles. The demand for different versions of large luxury cars especially has increased significantly. As a result, all Japanese automobile manufacturers have continued to increase not only the number of new models, but also the number of derivative models and versions. Ironically, this expansion, creating intensified competition, strained profitability..

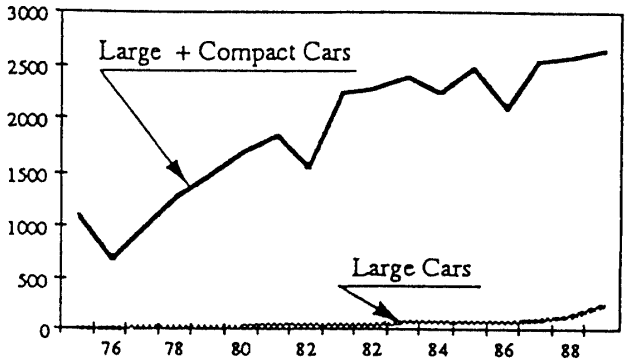
As shown in Figure 1, the number of the basic vehicle models has increased from 200 to 400 within less than a decade. Taking advantage of the diversified consumer needs, the manufacturers have desperately tried to weed out marginally desired vehicles. Even so, with the modest reduction, the variety of vehicles has generated a tremendous increase in the variety of parts, with a corresponding significant increase in cost.

Figure 1 Basic Vehicle Models and Model Numbers in Japan

(1) Basic Vehicle Models



(2) Model Numbers



(Japanese Department of Labour, White Paper of Labour 1992)

As the cycle of model change-over is shortened, the number of newly introduced models increased accordingly. This proliferation demonstrated an over-confidence on the high efficiency development system which led Japanese manufacturers to new product developments aiming at "haphazard success." As a matter of course, even with an efficient development system, the cost for the development and model change-over as a whole in creased without examining the possibility of compensating consumer demand.

There are some interesting cases in the japanese auto industry. For example, Suzuki continues to show profitability of Y20 billion as current profit. The reason for this stems from being a small company with a mind-set that could quickly respond to parts commonization under the company president's timely decision. Among Suzuki vehicle models, the Jimni model a four wheel drive mini jeep still exists, which has gone unaltered for 20 years and continues to sell 2000 units per month. This sales history points to the existence of a long term repeating customer base for a vehicle whose initial development costs have been almost, if not entirely, depreciated..

A strategic dilemma arises. It is whether to proceed with a marketing-oriented mind-set in new vehicle development or to pursue a manufacturing-oriented strategy that targets low-price oriented, stable customers who value basic practical performance. Strategies of Japanese companies waived until the Heisei recession, Japanese auto manufacturers were well-aware of the practical approach, like the one used by Suzuki. Yet, the trend has been running in the opposite direction. Of course, among this group, certain innovations did exist, such as car electronics and compact but high performance engines with low noise and vibrations. Then there is a different option : whether or not it is possible to use an older model for the long term. One implication stood out : that companies should recon-sider the thinking about product development.

The advent of the Heisei economic recession coupled with the deteriorated export profit, from the appreciated yen, imposed a heavy burden on the Japanese automobile manufacturers. In accordance with the restructuring era, the development strategy is likely to undergo a cataclysmic change. Initially, manufacturers reduced production by 20 to 30 percent. This reduction on such a large scale disrupted many of the economies from large volume purchases, unification, and commonization of parts.

Referring to the cmmonization of parts, for example, Honda seems to have succeeded in commonizing 60% of the parts for its "Domani" model. As for the light cars of low value and the large-sized trucks which are directly affected by depression, an industry-wide promotion of parts unification and commonization among different manufacturers is being planned.

Overcoming the Japanese auto conundrum is turning out to be difficult. Cost cutting by eliminating waste and the "fat" portion reaches a limit. Of course, companies have shriveled unnecessary cost. The savings though have hardly countered the appreciation of the Japanese currency. A more devastating problem than the appreciation ot the Yen is seizing Japanese companies. Overcapacity has surfaced in Japan as it has in other countri-es. In Japan, 11 motor companies have a total capacity to produce 14,5 million vehicles. Because of demand shrinkage at home and abroad, these 11 companies have rolled out only 11,6 million units, leaving an estimated 2 million units of overcapacity. During the "bubble economy" period, many Japanese auto manufacturers, having low cost funds and available equity, invested heavily in building and automating plants in anticipation of a labor shortage in the young workforce in the late 1990's. These investments expanded capacity just before demand slumped, which exacerbates the overcapacity problem.

Responses to overcapacity have followed traditional practices. For instance, Nissan Motors, which has already announced a plant shutdown for the Zama plant, is transferring assembly to the new automated Kyushu plant, which rapidly bolsters operating capacity. In other cases, companies have laid off employees or decreased the speed of the assembly line.

4. Conclusion

As was previously noted, the Japanese auto industry's restructuring strategy is still occurring. There is a close connection between the restructuring strategy and globalization. On the other hand, the Japanese auto industry has the advantage in obtaining the lean production system.

Durig the bubble economy period, the industry strayed from its original point of lean production toward non-lean production. What will happen now ? If the industry adopts a post lean system, what would be its contents ?

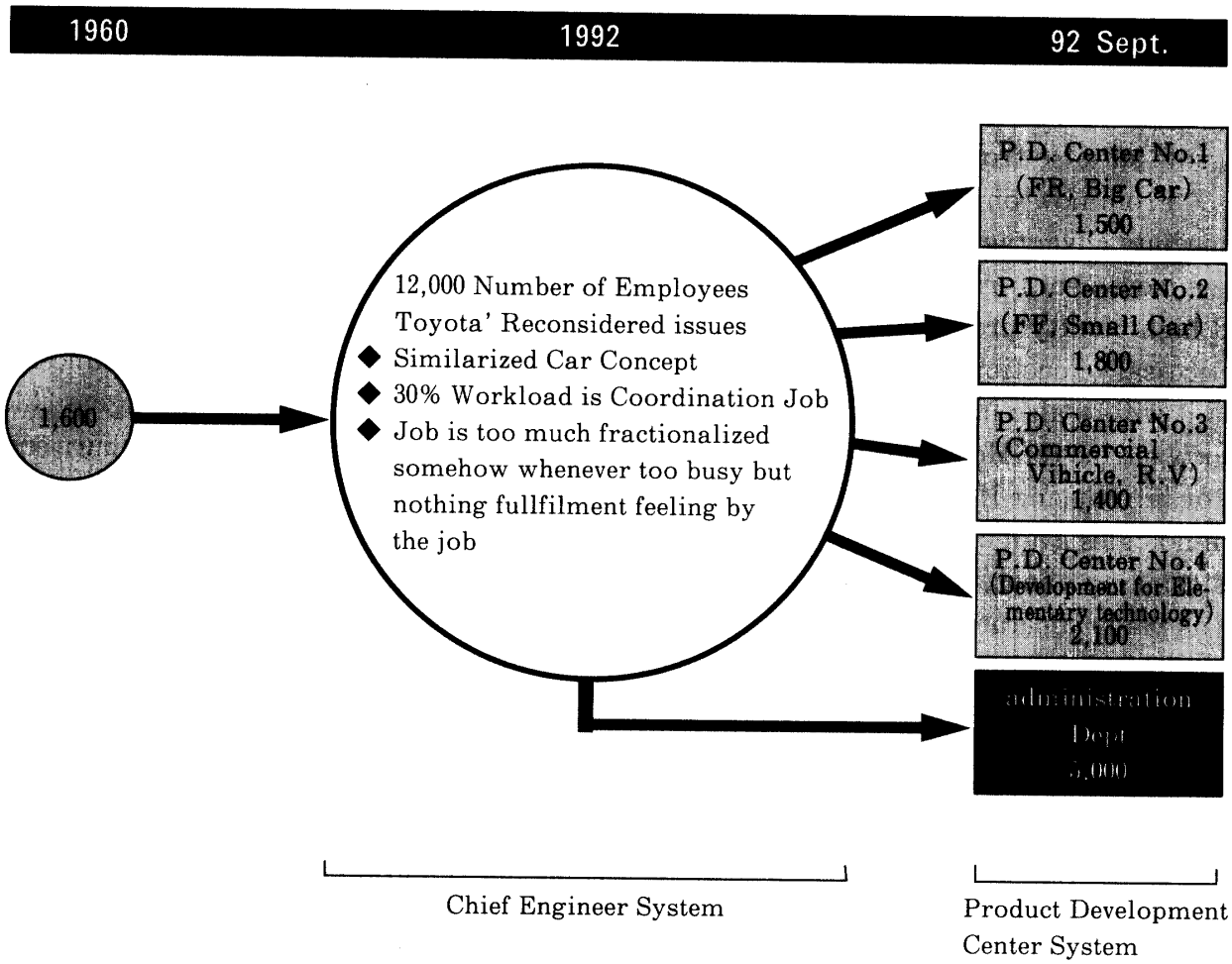
The American Big Three have learned about the lean production system in their own experience. Recent journals state that as a result of this, American cars have rebounded in price and quality competitiveness. This rechallenge by U. S. manufacturers depended very much on the American style restructuring which included radical plant shutdowns and scaling down the number of white collar workers. As a result, their break-even point decreased considerably. Afterwards, the ratio of the plant capacity being used increased because of the U. S. auto market recovery.

Up until now, the lean system has been evaluated quite highly by many world industry analysts. However, its premise relied on the continuous growth of the world auto market, especially that of developed countries. The premise of the post lean system should be a new production system with mature demand and a slow growth curve. The critical issue

for the Japanese industry centers on establishing flexibility in responding to a changing demand. Historically, the Japanese production system tended toward flexibility in its ability to respond to model changes. Japanese companies must convert the flexibility for model changes into flexibility for changing volumes.

What about the notable points in which can imagine post lean system as the new trial through japanese auto restructuring ? One thing is the releannization of product development system Which had been changed from lean system to "fat" one, and furthermore long range perspective in the development strategy is appearing now. Secondly, more com-

Figuer 2 Toyota's New Introduced Product Development Center System



(Nikkei Business 1993 June 21)

pletely pursueing simultanuous enginneering is going to reach deepen integration of production—parts purchasing—design development as the total system. Thirdly, there are emerging new tendency to come back human-like automation more higher evaluated shopfloor skillfullness and inteligency getting rid of hard oriented automation. Even for the development system which has been praised for its high efficiency, the organization of this system is going to reviewed. For example, Toyota Motors, the originator of the development manager system, has reviewed its organization structure of the Development Group consisting of as much as 12,000 employees. In the former organization, a development manager directed a horizontal organization consisting of such functions as design, body, engine and

so on to develop a certainmodel. This organization was arranged into four development centers of FR, FF, multi-purpose RV, element technology developmentall of which are given with respective discretionary authorities. (See Figure 2) It is said that this change is the result of the reconsiderstion that the old system required a lot of energy for the coordination between departments and a oversized organization as a whole, and that all models are developed similarly with less identity. This means that even Toyota, who was self-confident as the No.1 company in terms of development efficiency, has become negligent of the starting point of development while pursuing the development of more and more high classed vehicle as fast as it could, and has come to encounter the problem of oversized development organization.

Thus, Japanese automobile manufacturers are now forced to face the era of restructuring them selves and going to change drastically their development stance not only former way of product development on the assumption that production volume steadily continues to grow but also from the former way of competition to follow whatever Toyota does.

From now on, developments with long term perspective without being captured by immediate advantages will become very important. Some examples of this new trend will be, a movement for recognizing again the starting point of development, realizing low cost and high quality products by reducing the cost as far as possible through ommission of unnecessary functions without sacrificing the fundamental features and performances. And it will be also included development of small-displacement and high power engine (like as new engine for Honda Civic and Mazda'Miller Cycle engine), introducing Lean burn engine or introducing Hybrid engine, by placing emphasis on development of long term element tech-nologies available for long use just like Honda has been doing and other manufacturers has thinking about, and the development of components or platforms which can be used for as many generations as possible.

This development stance to pursue not only immediate efficiency but also genuine efficiency of development would bring about an innovation in Japanese automobile industry to pursue individual genuine identity of product development instead of the conventional way of development in which the manufacturers strongly tended to engage in horizontal, head-on competition.

It is prominent tendency, through more complete simultanious enginneering, shortenning leadtime and cutting cost for design development evenif car' model change cycle become more longer. Some auto maker like as Mitsubishi is just going to try to short leadtime 18 month for some forthcoming vehicle. Relating with this trend, it is also prominent that strengthen collaborative VE activity with assembler and supplier and showing their product strategy in early step by auto maker to their supplier. Prominent supplier involves more earlier for auto maker' making product concept step as well. And the participation for auto maker' product design conceptualization process by purchasing department has appeared recently, especially B-D fusion (Buyer-Designer) is introducing by participation of international purchasing department. Untill now there was P-D integration (Purchsing-Development) but it become more famous in Honda that design function and development purchasing function, through B-D fusion, collect avilable technical information before design drawing. Another way, it is going to proceed production-design integration which

design for more easier manufacturing to prevent the loss by more investment for jiggs and tools. In this integration two department' mutual transmission do proceed thoroughly in the process of conceptualization of the vehicle. In the case of Toyota new RaV-4, this kind of integration fully pursued.

Thirdly, it has been reflecting too much higher hard oriented automation investment with in creased production capacity during bubble economy. Japanese auto maker now is much interesting in to enhance their evaluation for their worker' skillful and intelligent level, software of quick responding capability for emergency, and T. P. M capability, rether than enhancing automation ratio. For instance, in Toyota Kyushu plant and new rebuilt Motomachi RV assembly plant final assembly lines were split up 10 or 5 more shorten lines. There are process buffer among divisional portion lines with progress allowances, then it makes easier job rotation and skilled training in the portion line. Both plants decreased automation ratio from 20% to 15% rather than most modernized Tahara plant no. 4 line which prouded higher automation ratio. In Motomachi new line even body assembly line decreased it' automation ratio from 90% to 65%. It seems that the plant will do advance more easily usable shopfloor automation with accumulating skillfulness and it' operating software step by step.

As I noted, among proceeding restructuring strategy, pallaleling to come back from "fat" to lean, there are new development for some origin of post lean system, like as changing for development concept, number of parts, model change cycle, development system, and reconsideration of automation contents.

REFERENCES

BOOKS

Kim B. Clark, Takahiro Fujimoto : *Product Development Performance—Strategy, Organization, and Management in the World Auto Industry.* Harvard Business School Press, 1991.

James P. Wormack, Daniel T. Jones and Daniel Roos : *The Machine That Changed The World.* Rowson Associates, 1990.

William J. Abernathy : *The Productivity Dilemma.* Johns Hopkins University Press, 1978.

Alan Altshuler and Daniel Roos : *The Future of the Automobile.* MIT Press, 1984.

Michael A. Cusumano; *The Japanese Automobile Industry.* Harvard University Press, 1985.

Robert Sobel; *Car Wars,* McGraw Hill, 1984.

Toshihiro Nishiguchi : *Strategic Industrial Sourcing.* Oxford University Press, 1994.

Bernard N. Slade : *Compressing the Product Development Cycle.* American Management Association, 1993.

Koichi Shimokawa : *Japanese Automobile Industry-A Business History.* Athlone Press, 1994.

Koichi Shimokawa : *Jidosha* (Automobile) Nippon Keizai Shinbun, 1993.

PAPERS

Kim B. Clark, W. Bruce Chew, and Takahiro Fujimoto : "Product Development in the World Auto Industry", Brookings Papers on Economic Activity, No.3, 1987.

Takahiro Fujimoto : "Organizations for Effective Product Development : The Case of the Global Auto-

mobile Industry", Ph. D. thesis, Harvard Business School, 1989.
James P. Wormack and Daniel T, Jones ; "From Lean Production System to the Lean Enterprise", Harvard Business Review, March-April. 1994.
Koichi Shimokawa : "Automotive R&D system in Japan : Its Specific Feature&Formation of Simultaneous Engineering", Paper for FISITA, 1994.
"Making It Work : The Real Challenge of Globalization for Japan's Automobile Industry", Paper for IMVP 1993 Forum.
Nikkan Jidosha Shinbun, (Japanese Automotive News.)
Nikkei Business (Journal), 1994 Jan. 24, 1993 June 21.